

EFFECT OF INCORPORATION OF SESBANIA GREEN MANURE ON ELECTROCHEMICAL CHANGES AND RICE YIELD

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ABSTRACT

A greenhouse experiment was conducted using loamy sand soil (an ustifluvents) having pH 8.6, organic carbon 0.32 per cent, CaCO_3 1.5 per cent and DTPA extractable Fe 14 mg kg^{-1} and Mn 2.5 mg kg^{-1} . Incorporation of Sesbania green manure markedly decreased soil solution pH and redox potential (Eh) and resulted in marked increase in concentration of soil solution Fe from 9 to 15 mg kg^{-1} and Mn from 1.0 to 3.3 mg kg^{-1} . There was significant negative relation of soil solution Fe and Mn with pH ($r=-0.91^{**}$ and -0.83^{**}) and Eh ($r=-0.83^{**}$ and -0.81^{**}), respectively. The results of field experiment conducted on a sandy loam soil (having pH 8.1, organic carbon 0.3 per cent and EC 0.2 dS m^{-1}) showed that incorporation of green manure before transplanting rice along with 60 kg N ha^{-1} produced consistently higher rice grain and straw yield for 5 years than application of 120 kg N ha^{-1} . Green manuring resulted in 14-15 per cent increase in uptake of Fe and Mn and 5 to 6 per cent increase in uptake of N, Zn and Cu by rice over no-green manure treatment. After 5 years of rice cultivation, DTPA-extractable Fe and Mn increased from initial level of 8.04 and 6.14 mg kg^{-1} soil to 10.7 and 7.9 mg kg^{-1} soil in no-green manure plots, respectively. Green manuring further increased Fe and Mn content to 16.3 and 10.3 mg kg^{-1} soil, respectively. There was no significant change in DTPA-extractable Zn and Cu content of soil.